Letter from Alexander Graham Bell to Mabel Hubbard Bell, June 9, 1898, with transcript

ALEXANDER GRAHAM BELL TO MABEL (Hubbard) BELL Beinn Bhreagh, C. B. Thursday, June 9, 1898. My darling May:

I hate to write about myself — but you seem to be so much disturbed about me — that I must say something.

I am very much better — and am coming down slowly but steadily in weight.

My weight was 246 pounds when I left Washington. It has been coming down in an oscillating way and now averages about 237 pounds — a loss of about nine pounds. (Lowest weight 236). I have learned to be afraid of violent exercise — but for this the weight would come tumbling down more rapidly. I find that I can walk up and down the mountain without discomfort — if I take my time about it — and rest frequently — when I find my heart beats getting rapid. I have established a kite flying station on the top to give me some object for the climb — and I try to spend the whole afternoon in the open air. I don't need any pills — doctor or no doctor. There can't be much wrong Inside — if the exereta are all right! It is simply and purely blood pressure in the brain that must be avoided — and I think the best way to do that is to bring my weight down gradually — and take moderate exercise in the open air of such a character as not to quicken the heart beats much. Strange to say I feel that warning sensation in the head more walking down hill than up. My steps seem to jolt me more — and then I become conscious of a throbbing brain.

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I am taking every care — and feel quite well excepting for this one thing.

Now let me be. I am doing O. K.

The more I read the war news — the more I realize the importance of a flying machine in warfare. Just think of the uncertainty of the presence of Cervera's fleet in the harbor of Santiago. An aerodrome hovering over the harbor would have given exact information at once. Not only for scouting purposes — but for actual offensive work such a machine would be of priceless value. I am not ambitious to be known as the inventor of a weapon of destruction but I must say that the problem — simply as a problem — fascinates me — and I find my thoughts taking more and more a practical form.

The scientific experiments carried on in the laboratory for the last two or three years — have given me a basis of accurate knowledge which will undoubtedly be utilized one of these days — either by myself personally or by others.

Quite apart from Langley's object lesson — every bird that flies is a proof of the practicability of mechanical flight by objects heavier than the air. I have hitherto avoided allowing my mind to speculate too much upon the practical details of such a machine — for the patented devices of flying machine cranks show only too clearly — how far astray the most brilliant minds may 3 wander from practicable things — if experiment and theory do not go together. We must not allow our minds to speculate too far outside the domain established by experiment.

I think I now have a sufficient fund of data established by experiment to allow my thoughts some play — and practical details of a practical machine are looming up more and more as time goes on.

An aerodrome that will carry a man will be an expensive thing to construct, quite apart from the money that must be sunk in abortive experiments. Even if practicable plans were completely elaborated so that no money would be required excepting for actual construction — several thousand dollars would have to be expended. Many times that

amount would be required to build the first machine. I am afraid to go into the matter practically — but no harm can come from thinking over it.

Experiment with toys and apply the results to a larger machine to be built upon paper. Not only may a toy supply the knowledge for a large machine but perhaps also the funds with which to build it.

Suppose a new form of flying toy — or kite — could be put upon the market — and take (!). There might be money enough made from the toy to build an actual machine.

In 1890 — out of a population of 62,622,250 persons in the United States — 14,371,893 were children attending school. That is 22.95 per cent of the people were school 4 children. If we add children not in school — but old enough to enjoy a flying toy or kite — I have no doubt that the percentage would be bound to exceed 25 — or one quarter of the whole. Think what a market there must be for a new toy in the U. S. alone. Our population probably now exceeds 70 millions of people — and upon the above basis this would mean 17½ millions of children. If a new and taking toy could be produced that could be sold — say for a quarter — millions of them might be bought! Just calculate what this means in dollars and cents. Suppose a royalty of one cent to be charged upon each toy — the royalty upon every million sold would amount to ten thousand dollars. A royalty of 5 cents would yield fifty thousand dollars per million — a royalty of 10 cents — a hundred thousand. I am not anxious to be known as the inventor of a toy — but I must say I would be glad of the money to put into laboratory work.

Since coming here I have made two forms of flying toys that are really attractive — and could be made for a few cents. One flutters about like a bird.

This was made out of pasteboard — (sheep cards) — and a paper wind-mill was stuck on as a tail with a hat pin. It flies like a kite — and the wind-mill tail whirling round under the action of the wind — gives it a really living appearance. Even without wind it presents a pretty appearance when pulled along by a string. You should have seen Angus Buchanan

the other day trotting round and round in a circle — like a circus horse — pulling his paper bird after him. It 5 fluttered along like a pigeon. Attached to the end of a fishing rod the effect was still better. By moving the fishing rod round or simply waltzing round with it — the bird flew in a circle in a most life like manner.

Another variety of this toy has two sets of wings and a wind-mill tail.

This form is capable of an infinite number of variations. The rotation of the wind-mill tail can be utilized to work mechanical figures. For example a flying dragon. The tail can cause the rider to be continually whipping up his flying horse.

All sorts of moving mechanical figures could be operated by the rotating tail.

Don't you think that a toy like that would be apt to take? They could be made for a few cents.

In experimenting with kites I have been led to a new form of very great importance not only for scientific kite flying for meteorological purposes — but it its bearing upon flying machines. It was developed from the flying bird form on page 5.

The original model of the flying bird — had two wings — a tail and a small keel.

The steadiness of flight was improved by enlarging the keel. And this led me to try a form in which the keel should be the same size as one of the wings — and the angles between wings and tail the same i.e. 180°.

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Copying the arrangement of the Hargrave — kite — I tried two of these wing pieces fastened upon a stick — and tried the arrangement as a kite fastening the string as shown. Result: It flew beautifully — and steadily. In fact it is the best form of kite yet devised in my opinion — went up to a great height. My father saw the first experiment with it — and was much pleased. What surprised me was its indifference to position. It would fly keel up

as steadily as keel down and sometimes when the string touched the keel so as to tip the machine slightly to one side — it retained that position steadily in the air — floating on its side as if buoyant.

After one flight it had a slight bump against the ground which displaced one set of wings slightly — so that the corresponding wings in the two sets were no longer in the same plane. Dark lines show front set. Dotted lines the back set — tilted to one side.

But even this displacement did not affect the steadiness of the flight.

To test this important matter I have had another model made with adjustable wing-pieces. Former results were verified. I then left the wing-pieces loose upon the stick so that they could assume any position they chose under the action of the wind.

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Everything loose so that wing pieces can turn on stick into any position. Result: The kite was perfectly steady with the wing-pieces loose and free to turn. Under the action of a sudden squall the the machine was no longer strained by the wind. The wings gave — wing-piece would simply turn into a new position — without affecting the stability of the kite.

Important consequences result from this. As the wing-pieces support in any position — it is obvious that they may be caused to rotate without affecting the stability of the machine.

This will be tested experimentally by giving the wings a slight tilt — so as to cause them to revolve like a wind-mill. Should the kite, as I anticipate, be unaffected in its stability — the application a flying — machine is obvious.

The supporting wings may themselves be used as propellers — to give a horizontal motion to the machine — and when the propellers stop rotating the machine will not fall — but go gliding on. Wing-propellers — or propeller wings.

Your loving husband, Alec. Mrs. A. G. Bell, 1331 Connecticut Avenue, Washington, D. C.